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Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien

Basic theory of sampling procedures

IOTC ROS SFO TR11

Category: Sampling procedures

IOTC ROS SFO TR11



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This module aims to familiarize Observers with sampling programmes and their requirements employed in national and regional tuna fisheries as these will be used daily in their routine work.

In particular:

- IOTC ROS sampling requirements
- CCSBT sampling requirements
- Other programmes sampling requirements employed in national and regional tuna fisheries (if any).



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SAMPLING REQUIREMENTS

1. Sampling priorities
2. Biological measurements (numbers of fish per species to be sampled for length frequency and sex)
 1. Sampling protocols or methods for the collection of biological information
 2. Representativeness of the sample
 3. Species specific maturity scales



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IOTC SAMPLING PRIORITIES

Both the monitoring of hauls and the biological sampling procedures should be prioritised among species groups as follows:

SPECIES	PRIORITY (1 is the highest)
SPECIES OF SPECIAL INTEREST Marine mammals (cetaceans) and turtles, seabirds, whale sharks, oceanic whitetip sharks, thresher sharks, striped, black, blue marlin and Indo-Pacific sailfish).	1
DISCARDS/REJECTIONS OF TARGET SPECIES The 16 species listed in Annex B of the IOTC Agreement.	2
BYCATCH SPECIES All species, other than the 16 species listed in Annex B of the IOTC Agreement.	3
RETAINED TARGET SPECIES	4





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To fulfil IOTC management objectives scientist require a range of information on the fishery, at-sea catches, interactions and commercial landings.

Information on fishing event retained catch composition can be obtained from the vessel logbook (catch statistics) of recorded production.

The catch composition of the retained target and commercial by-catch species is routinely recorded from monitoring landings ashore. The length frequencies of these species can also be recorded from shore-based sampling.

Yet information on discarded catch for sharks and Species of Special Interest (SSIs), catch lost at the surface or unwanted by-catch that is discarded or has no commercial value is seldom recorded in vessel logbook.

To capture information that is not routinely available, observers are to follow sampling priorities identified by the IOTC.



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IOTC BIOLOGICAL MEASUREMENTS

Numbers of fish per species to be sampled for length and sex (where possible), according to IOTC sampling priorities.

Minimum → 1 individual per species per ton of total catch for a specific set (fishing event)

Maximum → 50 individuals per species for a specific set (fishing event)



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IOTC SAMPLING PROTOCOLS BIOLOGICAL INFORMATION

- Exhaustive Sampling: the totality of the catch or all individuals caught for this species has been subsampled.
- Systematic Proportional Sampling: a proportion (%) of the catch or of the individuals caught and brought on-board for this species has been sub-sampled in a systematic way. (E.g., every 10th fish is sampled).
- Systematic Random sampling of a Fixed number of each species: of the random sample taken, the fish are identified to species level. Once the main species have been determined, a pre-determined number of fish of each species is subsampled.
- Systematic Random sampling of a mixed species sample: of the random sample taken, a small random subsample is taken and biological information extracted.
- Systematic Random sampling of Priority species: of the random sample taken, priority species are selected and biological information extracted.



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REPRESENTATIVENESS OF THE SAMPLE

Samples to be representative of the total (catch, discards, bycatch)

1. Collect your sample at different moments
 - Of the hauling period (DLL, GIL),
 - Of brailing and/or shifting period (TPS), fishing period (TPL).
2. Avoid hand selection of fish.
 - Sample fish as it arrives to the deck (DLL, TPL, GIL).
 - Collect fish directly from the discharge conveyor belt, discharge net and/or discharge bin by tipping them into a bin.



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IOTC SPECIES SPECIFIC MATURITY SCALES



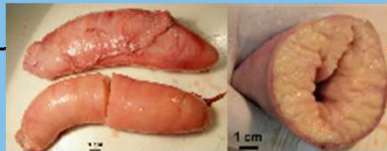

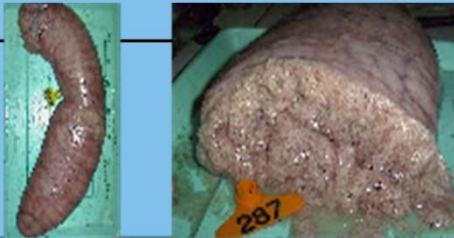

- No standard maturity scales have been officially approved to date by the IOTC.
- A SWORDFISH maturity scale has been defined in the context of the IOSSS Project (Indian Ocean Swordfish Stock Structure) implemented by IFREMER presented to the IOTC.



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SWORDFISH FEMALE MATURITY SCALE

<p>Stage 0 : Gonads small ribbon-like, not possible to determine sex</p>	<p>X</p> 
<p>Stage 1 – Immature Gonads elongated, slender, circular cross section. Length < 7cm . Sex determined by gross examination</p>	
<p>Stage 2 – Early maturing Gonads enlarged (length > 7cm) but individual ova not visible to the naked eye. Thin external wall. Lumen visible.</p>	
<p>Stage 3 – Late maturing Gonads enlarged, ova are visible and give a granular appearance.</p>	
<p>Stage 4 – Ripe Ovary greatly enlarged, ova individualized and creamy. Thin and vascularized external wall.</p>	
<p>Stage 5 – Spawning Ovary big and highly vascularised. Very thin and transparent gonad wall. Ova visible through the external wall. Upon incision ova runs freely under moderate pressure.</p>	
<p>Stage 6 – Post-spawning or atresy Includes recently spawned and post –spawning fish, mature ova remnants in various stages of resorption.</p>	



SWORDFISH MALE MATURITY SCALE

Stage 0 : Gonads small ribbon-like, not possible to determine sex	X
Stage 1 – Immature Tests extremely thin, flattened and ribbon like, but possible to determine sex by examination. Width of cross section < 1cm	
Stage 2 – Maturing Enlarged tests, triangular in section. The width of cross section > 1cm. After section, a droplet of sperm can appear if you press lightly.	
Stage 3 – Ripe Testes large and well developed. White to pinkish colour. After section milt flows freely without pressure.	
Stage 5 – Spent or resting Testes flabby, bloodshot Surface dull red. Little or no milt in central canal.	





CCSBT SAMPLING PRIORITIES

Both the monitoring of hauls and the biological sampling procedures should be prioritised among species groups as follows:

SPECIES	PRIORITY (1 is the highest)
SOUTHERN BLUE FIN TUNA	1
OTHER TUNAS, BILLFISHES, GASTEROCHISMA, AND SHARKS “other tunas” means all Thunnus species except SBT	2
ALL OTHER SPECIES	3

The allocation of observer effort among these activities will depend on the type of operation and setting.





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CCSBT BIOLOGICAL MEASUREMENTS

Biological measurements are only required for SBT

Minimum →

200 individuals per trip or every individual if less than 200 caught.

The actual number of fish should be spread throughout as many separate fishing operations as possible.

For example, it is nearly always the case that sampling 20 fish (randomly) from 10 operations is much better than sampling 200 fish from every 10th operation.



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ANY QUESTIONS?



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